

Downtown Plymouth: the worries began shortly after December 1972, when Pilgrim opened. Today, everywhere you go in Plymouth, people are talking about Pilgrim.

Our Nuclear Town

The Pilgrim Station nuclear power plant is shut down now. But it will go back on line this spring, and people in Plymouth are scared.

BY GREG O'BRIEN AND JEAN STEARNS

The sky is beginning to show some streaks of light over in the East. . . . The morning star always gets wonderful bright the minute before it has to go . . .

—Thornton Wilder, *Our Town*

THE SKY TO THE EAST OF GURNET POINT IS INDEED showing flecks of light as the morning sun inches toward the horizon over Cape Cod Bay. There's a touch of winter in the air. The temperature is low, in the fifties; the water is a deep autumnal blue; and billowy gray clouds—the tail end of Hurricane Charley—are screaming out to sea. The surf beyond nearby Saquish Neck is churning.

It is 5:42 a.m. and the old Plymouth wharf is starting to come alive. High winds and pelting rains have held the fishermen at bay these past few days, and they are eager to get back out to Stellwagen Bank, a favorite fishing ground northwest of Provincetown where flounders, cods, and blues are biting. One by one, the pickup trucks, mostly Fords and Chevys, lumber onto the wharf—a string of old slips and piers framed by such landmarks as Mayflower Seafoods, a rambling white-shingled building where crabs are a specialty and lobsters are selling today for \$2.89 a pound. At the end of the wharf, tied to a T-shaped pier, are the draggers *Frances Elizabeth*, *Nicole 1*, and *Alosa*. To the left of the pier is a long

rock jetty that juts almost halfway out into the inner harbor; a swarm of sea gulls is perched atop it. To the right of the pier are scores of sailboats, their masts turning the harbor into a field of flagpoles.

At first light, Plymouth is peaceful. And if you close your eyes for a moment, you can believe that you're in Grover's Corners, the fictional New Hampshire hamlet of Thornton Wilder's Pulitzer Prize-winning play *Our Town*.

Plymouth's local paper, the *Old Colony Memorial*, will soon hit the stands. Today's edition will have stories about a shark sighting, a boat accident, and storm damage. But on the front page above the fold, a one-column story will attract (as its subject always does) a lot of attention. Headlined "Edison to Double Safety Drills," the story notes that "for the first time in the company's history, Boston Edison has scheduled two emergency preparedness drills in one year" for the Pilgrim Station nuclear power plant, which sits at Rocky Point, just a few miles from the Plymouth wharf. A related story tucked inside the paper on page five matter-of-factly announces that "the state public health department plans to study communities near nuclear power plants in New England to see if residence there can be linked

Contributing writer Greg O'Brien is the editor of the Cape Codder; Jean Stearns is a contributor to that newspaper.

PILGRIM NUCLEAR PLANT

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JOFFREY SPAULDING

(seated, center) at a meeting at the house of Pilgrim Alliance leader Joan Barry (second from left).

"Boston Edison said in 1982 that there was a management problem.

They said they had taken care of it when they brought in new management. Now it's four years later, and we still have a management problem. What the hell's going on?"

to a high incidence of cancer."

Weeks later, a report on that study will say that Plymouth and four other towns near the Pilgrim plant—Kingston, Duxbury, Marshfield, and Scituate—have a higher than average incidence of leukemia and bone-marrow cancer. The health department committee, the report will note, found that between 1982 and 1984 bone-marrow cancer and leukemia rates were 95 percent above the expected level for men and 59 percent above the expected level for women. In short, there were 52 cases of leukemia or bone-marrow cancer reported during that period among the 100,000 people living in those five towns (40,000 of them in Plymouth).

The report stated that the department would continue to monitor cancer rates.

FOR MONTHS NOW, PLYMOUTH HAS had to live with distressing daily reports about the Pilgrim plant, which has been shut down since last April but is scheduled to reopen in April 1987 if the Nuclear Regulatory Commission (NRC) approves. In the meantime, many in town have soured on the plant.

It wasn't always like that. Before construction began on Pilgrim, in 1967, the 18,000 Plymouth residents knew little about nuclear power. Most of them were more concerned with lobstering, gardening, tourism, or the textile industry.

By the late sixties, Plymouth had fallen

upon hard times. Many of the town's textile mills had closed and moved south. Then, in the mid-sixties, the famous and prosperous Cordage Rope Company, at the time the world's second largest rope maker, joined forces with an out-of-state competitor and shut its Plymouth doors. It was a blow to the town, putting scores of employees, many of them of Portuguese and Italian descent, out of work. In its heyday, the company had outfitted the USS *Constitution* (Old Ironsides) and provided the Ringling Bros. & Barnum and Bailey Circus with 73 miles of rope a year for the Greatest Show on Earth.

When the Cordage Rope Company left town, Plymouth had little to fall back on aside from seasonal industries: tourism, a little fishing, and cranberry production. So when Boston Edison officials came to Plymouth to sell the townspeople on a proposal to build a 670-kilowatt nuclear power plant (clean industry, as it was called), promising jobs and hefty tax breaks, the town greeted them with open arms. At the time, Plymouth residents were too pleased with the economic rewards they expected to reap to raise any serious questions. And Edison made good on many of its promises. The plant's \$231-million construction attracted thousands of tradespeople and construction workers—forever changing not only the landscape but also the nature of Our Town. These people brought their checkbooks with them to buy locally sold clothes, food, and cars and to develop large tracts of what had previously been isolated and wooded land.

But suddenly Plymouth wasn't the same anymore, and the locals began to wonder what they had wrought. The worries began shortly after December 1972, when the plant opened. There were shutdowns, some for what Edison called pinhole leaks—small releases of radioactive gas. Edison said they were nothing to worry about.

Almost 14 years later, many townspeople have serious doubts about the plant and grave concerns for their own safety. Everywhere you go in Plymouth people are talking about Pilgrim. On any given day you can catch an earful in Jack's Restaurant, where the coffee is good, or at the pricey Governor Carver Motor Inn, where a filet mignon will cost you \$14.50. Or on the Plymouth wharf, where Walter Rogers moors his 48-foot dragger, the *Helen May*, which was built in 1927, the year he was born. Rogers, whose father and grandfather plied these waters, fishes for flounder and cod. "Ain't got a haddock here since 1969," he complains.

Like many people in Plymouth, Rogers would like the plant to be closed for good but sees no real chance of that. "It's too late now," he says. "What we got to do now is find a way to live with it."

The April 26 accident at Chernobyl was bad news for the nuclear power industry; it was also bad timing for Pilgrim. Between

April 4 and April 12, just weeks before the Chernobyl accident, Pilgrim's reactor had automatically shut down two times after two valves and an emergency shut-off device failed. One of the valves, according to Edison, leaked "slightly radioactive" water at about 42 ounces a minute from the reactor core; the second valve closed and failed to reopen, subsequently activating a computerized shut-down device.

The NRC, the butt of much criticism itself, on May 20 ordered that the plant stay closed until Boston Edison had corrected the problem and brought the facility up to minimum NRC safety standards. But that was not all Edison was asked to correct. In an evaluation released earlier in the year, the NRC had given Edison the lowest possible rating for its management of the plant and for emergency preparedness. On May 22, NRC commissioners called the plant one of the worst run in the country and threatened to yank Edison's operating license if the utility didn't shape up.

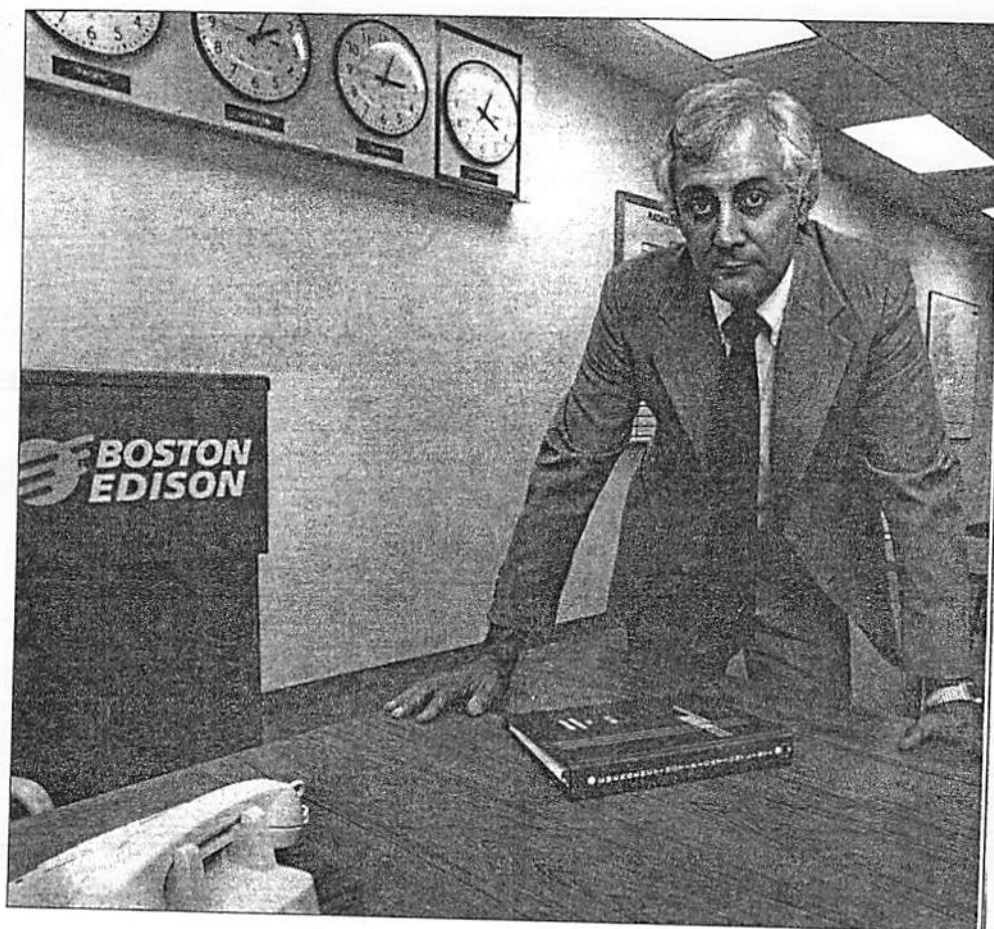
All this triggered a media blitz that created still more problems for Edison. For weeks there was exhaustive media coverage of the strikes, protests, public meetings, and congressional hearings that followed the closing; stories also surfaced about missed safety-check deadlines, more radiation leaks, and radiation releases above the anticipated levels. A rolled-up rubber glove found last spring in a safety system led to speculation as to how it got there: An accident? Horseplay?

Then, in late June, a state Department of Public Health official reported what many critics of the plant had feared all along: an increase in bone-marrow cancer and leukemia among males living in Plymouth and surrounding communities.

And as if that weren't enough, the state Department of Public Utilities, picking over the remains of Boston Edison's carcass, concluded in a 300-page report released June 26 that management was paralyzed to the point that it could no longer run the company properly. In jeopardy, the report maintained, was "the health and safety of its [Boston Edison's] customers and the economy of the region. The company's apparently cavalier attitude toward these impending consequences is a development which we regard with extreme alarm."

Meanwhile, South Shore congressman Gerry Studds, who had been silent on the Pilgrim issue, claiming the subject had been raised only once in 21 open meetings he had held in Plymouth, suddenly found his tongue and requested that fellow congressman Edward J. Markey's House subcommittee on energy conservation and power hold a congressional hearing on problems at Pilgrim. At this hearing, on July 16, Edison's biggest guns sat for hours in the hot seat under glaring TV lights. By then no one could dispute the fact that things were not going well on Cape Cod Bay.

Finally, on July 25, Boston Edison an-



ROGER SILVA

Pilgrim's emergency preparedness coordinator.

"People don't understand the words *nuclear* and *radiation*. And when they come up in a conversation, people can't be objective about them. I'm not saying people don't have a right to speak out, but it's too bad they don't understand the industry better than they do."

PILGRIM NUCLEAR PLANT

nounced that Pilgrim would remain closed until early 1987 so that flaws in its containment system could be repaired. Using rhetoric now long familiar, Edison spokesman Carl Gustin declared in a statement to the press, "The plant is safe, it has been safe, but there are things that can be done that will enhance the margin of safety."

IT IS 8:10 A.M. AND GELLAR'S, A ROADSIDE clam shack at the corner of Route 3A and Beaver Dam Road, in the Manomet section of South Plymouth, is starting to get busy. Workers on their way to their jobs and tourists on their way to Whitehorse Beach are lining up for coffee. The old clapboard building attached to the rear of a Texaco station shows plenty of wear: salt air has eaten through much of the white paint and the windowsills are rotting. Dick Ragazzini and Ron Zion, bulky men dressed in jeans, work boots, and T-shirts that barely make it over their bellies, are seated in a pickup truck in a gravel parking lot in front of Gellar's. Ragazzini is sipping coffee; Zion is sucking down a large cola.

"This used to be a quaint town," says Ragazzini, 50, a computer operator who runs a part-time landscaping business with Zion. "It isn't anymore and it will never be again. I think the plant was the single thing that ruined this town."

Ragazzini blames town officials more than he blames Edison. "It's the town fa-

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(Continued from page 213)

thers' fault," he says, raising his voice. "They wanted them in here, they got them in here. They thought it would be good for the economy. Now they don't know what the hell to do with them."

"I think they'd like to think it was the right decision, but right now they can't," says Zion.

Pilgrim never turned out to be the economic panacea residents had hoped it would be. During the plant's first 10 years of operation, for instance, the town's population doubled but its expenditures increased fourfold. New schools and roads had to be built; more police and fire fighters were needed; municipal services had to be improved and increased. While Edison paid approximately one-third of the town's property taxes, revenues never caught up with

Hill says that even if he were to be offered his job back, he would never return: "Not so much because of the radiation but because of the lying that went on. I could never believe what they were saying again. I'll tell you one thing, if that plant is to open again, it better be carefully monitored by outside and independent people."

expenses. For a prosperous community, Plymouth was one of the most impoverished in the state.

Residents have recently been putting their homes up for sale at an alarming rate. On this particular day there are 10 For Sale signs out on Rocky Hill Road, an upper-class neighborhood filled with antique Capes, spacious saltboxes, and sweeping ranches that have panoramic views of the harbor and are about half a mile from the plant.

"People here are scared," Ragazzini says. "In the beginning, everyone thought the plant was a good idea. It was a marvelous thing as far as everyone was concerned. Everyone prospered, but we're paying for it."

"Now I think you're going to see the whole thing swing back the other way. I really think we're going to have a nasty situation here. I know there are banks in this area so deep into these homes that if the

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owners walked out, they could never sell them for the money they have invested in them. And I think things are going to get worse."

While some people are leaving, the majority will stay—among them natives like Rogers, Ragazzini, Zion, and Barbara Brown, manager of Leo's Bakery, on Main Street. "I would say that 8 out of 10 people I know would like the plant just to pack up and leave—including myself," says Brown, a mother of four. "But how can any of us afford to move? If you move quickly, you're going to have to dump your house. We're trapped."

IT IS 10 A.M. AND BROWN IS GETTING ready for the noon crowd. Leo's Bakery, on the first floor of an old building sandwiched between the Mug 'N Muffin and Plymouth Music, is not far from the intersection of Main and Leyden streets, where the Pilgrims are said to have celebrated the first Thanksgiving. Dressed in a smock stained with chocolate, leaning against a counter, Brown tells a visitor she thinks Edison has lied to the town. She says she's bitter.

"My mother died 3 years ago from lung cancer," she says. "She worked as head housekeeper for 20 years at the Yankee Traveler, a hotel about a mile and a half from the plant. The possibility has certainly run through my mind that she got sick from the plant. She was so close to it."

"Cancer," Brown adds, "is on everyone's mind. I know of two children who died recently from leukemia. These are people I know, not someone I read about. Also, one of the girls who works here has a sister who has leukemia. Everywhere you go, you seem to see it."

But when asked about the future, Brown says she's not worried. "Edison will be a lot more careful from now on, if they are allowed to reopen that plant. Anyway, I feel it's too late. If there has been any damage, it's already been done."

She pauses for a second, then shrugging her shoulders, adds, "It's already happened."

SHORTLY BEFORE NOON, 47-YEAR-OLD Jack Hill, a slight man with prematurely gray hair, is standing outside Pilgrim's front gate, making plans for another demonstration. A former decontamination worker at the plant, Hill recently discovered he has a blood disorder. "My blood count is very low," he says. "I never had any problems until I started working seven years ago at the plant." He and about 80 other maintenance people still working at the plant were let go May 1 when they walked off their jobs after Edison fired one of their number for allegedly smoking in a restricted area. All are members of Laborers Union International of North America, local 721. Hill, a spokesman for the group, says the fired worker was

set up—a charge Edison vigorously denies.

In midsummer the group held its first big demonstration to protest conditions at the plant. "We put a dummy in a casket and put a mutant doll next to it," Hill says. "The doll had three arms: one growing out of its head, one out of its chest, and one out of its back."

Hill's job was to shield pipes, clean up radioactive debris, and decontaminate areas of the plant. Hill says he was a member of "the suicide squad." They wore masks and protective clothing.

"This may come as a shock to you," he says, "but we never knew the extent of most of the radiation leaks. We were just told to go in and clean them up. We didn't find out until recently. It blew our minds."

"Edison," he adds, "used to tell us at annual training sessions that nobody ever got cancer. They used to say, 'You won't pick

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up any more radiation than you would watching TV or being out in the sun. That was bullshit. They lied but we believed them. We had no reason not to."

Pressed for details, Hill mentions a 1982 incident involving "burped radioactive resin." "Filters broke," Hill recalls, "and the resin [used to extract radioactive material from water in the reactor core] bypassed the filters and was released into the atmosphere. Edison at the time said that only a saltshakerful of radioactive material had escaped. Well, people must have 55-gallon drums for saltshakers, because that's how much was released."

Hill also remembers the time Bechtel, the company that holds the maintenance contract for Pilgrim, asked him and another worker to don their protective gear and cut up a radioactive metal cart. "They told us the room was properly ventilated and there would be nothing to worry about," he says. "So we went in. I lit a torch and began cutting up the cart. It had been used to carry control drive rods, and was too radioactive to be decontaminated. After a while I looked over at my partner, and he was asleep. I continued working, but then for some reason shut off the torch and dragged him out. It was a good thing. We were both suffering from carbon monoxide poisoning [from exhaust from the torch]. But not only that, if carbon monoxide was able to get

through our filter system, imagine how much radiation got through. We later found out that the ventilation or filter system was hooked up in the room but not turned on."

Hill says he had assumed that he was relatively healthy until last fall when company doctors told him after his annual checkup that he had some strange blood ailment. "They told me I had the same kind of anemia that women get when they have their periods, which means I was bleeding internally."

Hill says he has been told to abstain from all strenuous exercise. "I used to run three to five miles a day," he says. "The doctors told me to stop. They are afraid of my bones breaking because they are so brittle now."

While Hill says that his doctors are still diagnosing his condition, "there's no question, at least in my mind," he says, "that it was caused by exposure."

Hill says that even if he were to be offered his job back, he would never return: "Not so much because of the radiation but because of the lying that went on. I could never believe what they were saying again. I'll tell you one thing, if that plant is to open again, it better be carefully monitored by outside and independent people. Otherwise, I think it's just a matter of time before we have an accident."

WHAT TO DO IN THE EVENT OF AN ACCIDENT at Pilgrim has been the topic of much debate in Plymouth. No one seems to agree on how large an area should be evacuated, how the evacuation should proceed, or who is responsible for evacuation plans.

It should be noted here that it is the state's responsibility to compile and test evacuation plans, not the NRC's—even though the NRC is the licensing agent for nuclear power plants. Federal regulations also require the state's participation in evacuation drills. This gives states some clout in overseeing the operation of nuclear power plants. New York governor Mario Cuomo, for instance, stopped the licensing of a Shoreham, Long Island, nuclear power plant by declining to submit evacuation plans for it. Cuomo's stand gave Massachusetts governor Dukakis some ideas on how to block the licensing of Seabrook.

Almost two years ago, the nuclear power industry began pressing the federal government to relax regulations that require warning sirens and evacuation plans for everyone within a 10-mile radius of nuclear power plants. Industry representatives said that concerns about radiation releases had been blown out of proportion, and the industry began lobbying to shrink the evacuation zone from 10 to 2 miles.

Chernobyl has reopened the whole issue. According to a Soviet report on the accident carried in the *New York Times*, about 135,000 people were evacuated from an 18-square-mile zone around the Chernobyl plant. The report said the evacuees might

not be able to return to their homes for four years, that topsoil was being scraped up in parts of a 1,000-square-mile zone, and that in Kiev the fallen brown leaves of chestnut trees had been trucked away as radioactive waste.

As of September the Federal Emergency Management Agency (FEMA) had not yet approved Pilgrim's evacuation plans. All area residents have to go by is a nine-page evacuation booklet put out by the Massachusetts Civil Defense Agency/Office of Emergency Preparedness.

Many think that the delays are symptomatic of an overall complacency at Boston Edison. But according to the most recent word from Roger Silva, Pilgrim's emergency preparedness coordinator and a former chairman of the Plymouth Board of Selectmen, only the outside warning systems re-

In 1976, for example, Pilgrim workers absorbed nearly three times the national average, and in 1978 the NRC fined the plant \$16,000 for having exposed its workers to excessive radiation.

mained to be tested. (Full siren tests were conducted on September 29.)

While Plymouth residents may have the most to worry about in the event of an accident, such an occurrence would also be a nightmare for other South Shore communities and, for that matter, Boston—which is only 50 miles away. Cape Codders are especially vulnerable. Just outside the 10-mile evacuation zone, the Sagamore Bridge—gateway to the Cape—is only 12 miles from the plant. There can be no safe evacuation plan for the Cape, given the fact that fleeing residents would have to drive closer to, not farther away from, the plant.

Some enterprising Cape Codders have come up with their own plan. A T-shirt on sale in local shops displays a map of the South Shore and the Cape, with a mushroom cloud identifying the Pilgrim plant. Figures are shown jumping into the ocean from Provincetown, Truro, and Wellfleet. The caption reads: Our Evacuation Plan—Swim East.

IT IS 2 P.M. AND ROGER SILVA IS SEATED IN an antiseptic-looking office tucked away in the southeast corner of Pilgrim's INS (indocctrination and support) building. Behind him, about 100 yards to the east, are two large but unimpressive blue-gray concrete cubes housing the reactor and containment facilities. One cube is 100 feet high; the other, 150. There are no domes or cooling towers like

the familiar ones at Seabrook and Three Mile Island.

"The reactor vessel itself," according to an Edison handbook, "is a steel tank 66 feet high and 20 feet in diameter, with six-inch thick walls. It is housed inside the primary containment, a leak-tight steel enclosure, which is shielded with more than 50 inches of concrete and shaped like an inverted light bulb. Both the vessel and the primary containment, are then housed inside the second containment, an additional reinforced concrete and steel structure. Together they provide an effective, in-depth protective system against the uncontrolled release of radiation to the environment."

"What do you mean by safe?" Silva asks in a tone that suggests he's tired of the question. Silva, a handsome native of Plymouth with silver hair and olive skin, leans forward in his chair. "There are always risks involved," he says. "There is no such thing as a totally safe source of energy. There just isn't. But we feel the risks here are minimal."

In another interview, Silva and Robert Tis, who serves as Pilgrim's district manager and public relations head, point out that the company plans to spend \$100 million to make Pilgrim one of the safest plants in the country. Reforms, they say, will include increasing the plant's work force by 20 percent to reduce the amount of overtime needed, hiring specially trained decontamination crews, and improving the plant's ability to contain radioactivity. Both Silva and Tis stress, however, that the plant is already safe. The improvements, they say, will simply reinforce safety measures already in place.

Tis has been called Mr. Cool—the man you'd want to have talking to the press in the event of an emergency. With his gray hair, red cheeks, and easy smile, he cuts the right image. Both Tis and Silva are bullish on nuclear power. Calling nuclear power the most regulated and cost-effective source of energy, they claim there is no better alternative.

"Oil is not an endless supply," says Tis. "Solar isn't the answer and wind isn't either, because you can't get enough."

Both men predict an inevitable shift in the public's attitudes toward nuclear power. "I believe many people in this town still believe we're a safe plant, and are satisfied that we've been a good neighbor," says Tis. Adds Silva, a 41-year-old father of two, "But when you continue to see things in the paper day after day that take shots at us, it's going to shake the confidence of anyone in town. We've got to win that confidence back. For now, you just take your scolding, and then go out and do the best job you can."

"People don't understand the words nuclear and radiation. And when they come up in a conversation, people can't be objective about them. Look, we take a lot of grief we don't deserve. It's a shame. I'm not say-

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ing people don't have a right to speak out, but it's too bad they don't understand the industry better than they do. The industry is 25 years old now, and my guess is that some people will never understand it."

One thing that may help turn the tide of public opinion is the shortage of electricity that is anticipated in the next 5 to 10 years. "We expect to have shortages of electrical power in the 1990s in the Boston Edison service district, and that's with Pilgrim, Seabrook, and Millstone [in Waterford, Connecticut] on line," says Tis. "I don't think people in this country will stand for brownouts. They're not going to put up with power outages for two or three days."

Tis and Silva concede that there have been serious problems with the plant. "In general," adds Tis, "we believe the NRC criticisms are justified. As a company, we've made some mistakes." Silva distinguishes between Pilgrim and what are considered some of the best-run plants in the country by saying, "It's the difference between an A and a C student."

But Silva is quick to add that "the plant is absolutely safe. If you read the bottom line on all the NRC reports, that's in there every time." He pauses, then says, "I think our record speaks for itself."

But Pilgrim's record is precisely what troubles Plymouth residents. According to NRC statistics, between 1974 and 1984,

workers at Pilgrim were exposed to more radiation than employees at most other plants across the country during the same period. In 1976, for example, Pilgrim workers absorbed nearly three times the national average, and in 1978 the NRC fined the plant \$16,000 for having exposed its workers to excessive radiation.

There have been other problems too. In 1982 the company was fined \$550,000 by the NRC (at the time the highest fine ever imposed by the agency) for a number of management and maintenance deficiencies and for filing a false statement with the NRC. The plant's managers had delayed 14 months in notifying the NRC that equipment designed to prevent a hydrogen buildup in the reactor containment building fell short of government standards. A hydrogen buildup can cause an explosion.

There also have been concerns about a flawed pumping system. The pumps are used to provide cooling water to the reactor should there be an accident. Although the pumps turned on when they were tested by the NRC, there was indication that both the primary and backup valves could jam. Richard Swanson, Boston Edison's nuclear engineering manager, admitted in a press statement that without water running over the pumps, the pump motors would burn out "within a short period of time—a few minutes." Swanson was quick to note that other

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cooling systems could still provide water to prevent the reactor from melting and releasing radioactivity. But such reassurances have done little to inspire confidence.

Recent reports have raised other concerns: Pilgrim's reactor, for example, is said to be capable of withstanding only 20 pounds or less of pressure per square inch, whereas other reactors, according to the NRC, are built to handle 60 pounds.

Does Silva ever worry about a major accident? "Never," he says. "I never worry about it. First of all, I have insight that most people don't have. I have worked, for instance, for five years in the plant's maintenance section, and I know what we have for redundant [backup] safety systems. I have also worked in construction, and I know how the plant is built. I know the control room operators too. We probably have some of the finest operators and technical minds in the country. We have a lot of good, dedicated people working here. When we shut down, it is because an operator or a safety system takes an action that is supposed to be taken."

He chooses his words carefully. "Everything mechanical has the potential of failing. Mechanical things can break."

IT IS 4 P.M. AND MEMBERS OF A PROTEST group called the Pilgrim Alliance are gathered on Alden Street at Alliance leader Joan Barry's house, a two-story white garrison with front pillars and a porch. The house is comfortable but in need of work. Dishes are piled high in the sink. "Excuse the mess," the 51-year-old Barry says. "I just haven't had time to get to it."

Ever since Pilgrim hit the front page of just about every newspaper in the state, Barry, a teacher at Indian Brook School, in Manomet, has been using every free hour to campaign against the plant. Dressed in a pink smock and a white skirt, she looks more like a member of the PTA than an anti-nuclear activist. Barry appears younger than her years. She has a round face, blue eyes, and curly brown hair. She speaks softly but firmly.

Several members of the Pilgrim Alliance, which now boasts 1,000 supporters, are gathered at Barry's home to plan their strategy for an upcoming public meeting and for a November referendum. The referendum—nonbinding—will give Plymouth voters an opportunity to oppose the generation of nuclear power and the generation and storage of nuclear waste in their town.

What particularly bugs Barry today is Boston Edison's attitude toward the Alliance. Edison, Barry says, treats the Alliance like a group of hysterical housewives. "It's very demeaning," she says.

Barry is interrupted by a knock at the door. It's another member of the group, Joffrey Spaulding, a bundle of nervous energy in the body of a tailback. Spaulding rushes into the room with good news for the cost-

conscious Alliance. A local printer has agreed to run off 1,000 fliers for the Alliance free of charge. "The guy's got a family," says Spaulding, "and he's concerned about the plant. He said he wanted to do something to help."

Spaulding's enthusiasm is contagious. Like most members of the group, Spaulding considers himself a liberal—socially conscious, as he puts it. He's a product of the sixties who has jumped from peace movement to peace movement. A native of Boston, he and his wife moved to Plymouth in 1982 from Las Vegas, where they taught adults with special needs. They now live less than three miles from the plant, and for the past two years Spaulding has poured much of his considerable energy into protests against the plant.

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me that radiation could get beyond the plant. Then one day my next-door neighbor, who's an engineer there, said the plant was closing for a bit because there were some valves leaking. The next day I read about 'unauthorized spillages' in the paper. I didn't know there was such a thing. I started asking myself: What does this mean? Does it mean Pilgrim officials are not allowed to release radiation beyond what they are allowed to leak?"

So Spaulding went down to the public library, to a special section of the reference area set aside for Pilgrim documents and reports filed by Edison and the NRC in accordance with federal regulations. Spaulding began to bone up on the material, which includes an accounting of all malfunctions and problems at the plant. Today, Barry says, many of Spaulding's suspicions have been confirmed.

As a member of the Alliance, does Barry

PILGRIM NUCLEAR PLANT

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feel gratified?

"No," says Barry, "I feel sick. I feel disgusted. I wish we had been wrong."

From the beginning the Pilgrim Alliance has gone by the book—no violence, not even civil disobedience. But the group's patience is wearing thin. "As far as I'm concerned," Barry says, "this is the last time we're going through channels." She adds, as the others nod in agreement, that if Boston Edison "lies or tries once more to cut off debate at a public meeting, the Alliance will have to consider something more drastic." She declines to be specific but says: "We've tried every avenue the system has to offer. We've explored every legal means to make the plant safe. It just doesn't work."

"Boston Edison said in 1982 that there was a management problem," Spaulding says. "They said they had taken care of it when they brought in new management. Now it's four years later, and we still have a management problem. What the hell's going on? Look. They ought to stop telling us these silly things. We're not assholes. Please don't treat us like assholes."

THE CLAIM OF "BAD MANAGEMENT" has been a crutch Edison officials have fallen back on, critics say, to draw attention away from technical failures at the plant.

Until midsummer of this year there was a general agreement that management problems accounted for Pilgrim's woes. The more the NRC zeroed in on the disastrous management policies at Pilgrim, the more Stephen J. Sweeney, chief executive officer at Boston Edison and a 33-year veteran at the company, seemed to agree that that was the reason for Pilgrim's dismal 14-year history. The word *management* took everyone's mind off the technological problems, the safety issues, and the lack of emergency planning. It worked like a charm with the media—right up to and through Congressman Markey's subcommittee hearing on July 16.

Testifying before the House subcommittee on energy conservation and power, Sweeney enthusiastically embraced the management-as-scapegoat theme, saying that Pilgrim's management had not been sufficiently responsive to changes in NRC policy in the wake of the Three Mile Island accident. Sweeney nevertheless asserted that Boston Edison's past and current management problems were not directly related to safety.

"I find your testimony alarming and disarming," Congressman Studds told Sweeney. "That contention," Studds said, "is, with all due respect, absurd on its face. Management problems," he added, "are safety problems."

Though bad management was the focus of concern at the Markey hearing, the issue of a major design defect in Pilgrim's containment structure reared its not insignificant head. Studds noted that "the fact is

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that the NRC does not require containment structures to be able to withstand a core meltdown and that, indeed, the Mark I containment building in use at Pilgrim is perhaps the most likely of any design type in the United States to be breached in an accident." The NRC has admitted that the risk of a core meltdown in the next 20 years at a United States plant is between 12 and 45 percent, and Congressman Markey, in his opening statement, suggested that "the true figure could be higher." A few months ago Harold Denton, the NRC's top safety official, said there was a 90 percent chance the Mark I containment structure would fail during a severe accident. (In late September, however, other NRC officials said, while proposing a reform program for the containment system, that Denton's estimate was exaggerated and that they believe the containment structure could probably withstand the worst possible accident.)

The containment structure at Pilgrim (and 38 other American reactors) is a GE pressure-suppression system. Government officials have been aware of problems in the GE system since 1971—a year before Pilgrim was licensed.

As the summer wore on, it became obvious that Boston Edison could no longer ignore the safety issue raised by Pilgrim's Mark I containment system—or camouflage the issue by talking management reform. The hazards associated with the system began to be aired more frequently and insistently.

Chief among those hazards is bypass leakage. Bypass leakage occurs when steam is not successfully condensed; the increased steam pressure could rupture the containment and lead to a hydrogen explosion. The Union of Concerned Scientists (UCS) explains that because the Mark I containment is smaller than conventional systems, "a given amount of hydrogen, which is released even in relatively mild accidents, constitutes a greater percentage of the atmosphere within the containment. . . . Because of the small free air space in a pressure suppression containment, the hydrogen can create an explosive mixture that any spark could detonate. While various safety provisions are incorporated in US plants to prevent such an event, they are not foolproof."

Both the industry and the NRC have been aware of these hazards since the early seventies. This is made clear in a 1972 Atomic Energy Commission memo regarding the GE pressure containment system, which is exactly like the one at Pilgrim. A copy of this internal memo was requested by two UCS officials under the Freedom of Information Act. But when they received the memo from the NRC much of its contents had been blacked out, so the two UCS men asked Congress to intervene and to demand the full text. The uncensored copy, recently made public, says that "the acceptance of pressure suppression containment concepts by all elements of the nuclear field . . . is

firmly imbedded in the conventional wisdom. Reversal of this hallowed policy, particularly at this time, could well be the end of nuclear power. It would throw into question the continued operation of licensed plants, would make unlicensable the GE and Westinghouse ice-condenser plants now in review, and would generally create more turmoil than I can stand thinking about." Joseph Hendrie, the author of this memo, later served as chairman of the NRC.

In acknowledging that there are serious flaws in Pilgrim's containment system, both Boston Edison and the NRC seem to have

It's doubtful that Boston Edison became increasingly concerned about public safety or suddenly aware of flaws in the containment system. Shutdowns are expensive propositions—somebody has to pay for the replacement power.

come full circle. Tom Murley, the NRC's eastern regional director, said in early summer that after Three Mile Island the NRC had focused on plant safety in terms of reactor design and technology. In the early days a meltdown seemed unlikely, but "we came to realize it's more likely than we thought," Murley says. Nuclear power critics and proponents alike became convinced that holding people in the plants responsible for their actions was the first order of business. Safety became viewed as a management problem—not a technological one. Before the July 25 announcement that the plant would remain closed until problems were corrected, Boston Edison officials talked only occasionally about "design modifications" and flaws in the containment system. It had clearly been less dismal and less expensive to emphasize management teams and "excellence."

It's doubtful that Boston Edison became increasingly concerned about public safety or suddenly aware of flaws in the containment system. Shutdowns are expensive propositions—somebody has to pay for the replacement power. Carl Gustin, an Edison spokesman, has said that he expects that the state Department of Public Utilities will allow the company to pass on costs of this latest shutdown to the utility's 600,000 customers. But it may be the stockholders who'll have to foot the bill for the time that Pilgrim was closed in order to make management reforms. It costs Boston Edison \$250,000 a day to buy replacement power,

and it's estimated that by the time Pilgrim reopens next year Edison will have paid more than \$52 million for replacement power during the shutdown that began on April 4.

THE SUN SET HOURS AGO ON PLYMOUTH Harbor, turning the horizon a brilliant orange. Tomorrow looks as if it will be another good fishing day.

Three fishermen are gathered on the pier around a red Chevy pickup truck. The men are talking about the day's catch. The blinking red lights of Pilgrim are visible to the south.

When a visitor raises the subject of nuclear power, one of the men, 35-year-old Dan Clifford, says without hesitation, "I don't think fishermen as a group are any more concerned than the public at large. We're all going to have to leave this place if it melts down."

Actually, the plant initially had been something of a boon to the fishermen. "We used to love the plant," says 29-year-old Phil Torrance, skipper of the *Theresa M*, a lobster boat. "We used to catch bluefish all the time over there. They came right into that warm water coming out of the plant." Adds Clifford, "If you went over there on a day when the dew point and the temperature were pretty much the same, you could see the steam rising off the water. The bluefish used to come in early in the season and stay through October. We're talking tons of them. They used to chase in the bait fish. The lobsters also loved it."

But in the late seventies, fishermen became wary of dropping their pots and lines near the plant. A December 1978 article in *Newsweek* had reported that mussels found in Cape Cod Bay suggested that the area was a "hot spot" of plutonium (one of the most carcinogenic radioactive elements known). The plutonium was traced to the Pilgrim plant.

"The plutonium-rich mussels off Plymouth," the article stated, "alerted scientists that a nearby atomic-power plant was discharging nuclear wastes into the water."

Health officials today warn against eating bluefish, which are of a type that seems to retain carcinogens more than most fish do. Pregnant women, especially, have been urged to stay away from bluefish.

Torrance will tell you that these days, as far as he's concerned, the plant isn't worth the concrete it took to build it. Looking out toward Pilgrim's lights, he adds, "If you ask me, I think the whole thing was one big mistake. I think the town would agree."

Most everybody's asleep in Grover's Corners. There are a few lights on. . . . Yes, it's clearing up. There are the stars—doing their old, old crisscross journeys in the sky. . . . Eleven o'clock. . . . You get a good rest, too. □